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UNITED STATES.

[Reports to the Surgeon-General United States Marine-Hospital Service.]

Disinfection against scarlet fever.

[By H. D. GEDDINGS, Passed Assistant Surgeon, U. S. M. H. S.]

In the consideration of this subject, as in all other subjects connected with disinfection, the two general factors must be considered of the nature of the infection and the best means for destroying it.

As is well known, infection or communicability may be of two general varieties—the immediate, in which the disease is communicated by actual contact, and the mediate, in which the infection is communicated to articles or things and thence transmitted to others.

The infection of scarlet fever is of both natures. Immediate infection certainly can occur by the contact of a susceptible person with one suffering with the disease, but still more probable is it that the infection is highly mediate in its character and is communicated to the surroundings of the patient, furniture of rooms, bedding, clothing, etc., largely through the fine, scaly particles, which are given off by the patient and diffused with the dust of the room. This desquamation constitutes the essentially dangerous feature of scarlet fever from the point of view of the health officer, for even after his desquamatory process has been apparently completed it may be renewed and the patient again become capable of conveying infection. The poison clings with great persistency to clothing of all kinds and the furniture of a room, especially that which is upholstered. It is exceedingly tenacious in its character, and clothing which has been put away for months, or even for years, may, unless thoroughly disinfected, again convey contagion.

Observations which have been made from time to time show that the disease has been often transmitted through the medium of the milk supply, and recent experience in Detroit, Mich., has shown that even when the milk supply was not at fault, the disease has been communicated through the medium of milk tickets which were repeatedly used.

The specific germ of the disease is not known. Therefore, disinfection of rooms or apartments where the disease has prevailed must be conducted on general principles. These disinfecting processes differ in no wise from those employed for the other acute infectious or communicable diseases. The poison, while very enduring, is probably of a not very resistent nature, which is fortunate in view of the high contagiousness of the disease and its serious nature when prevalent in epidemic form.

It is desired to dwell with particular emphasis upon the danger which accompanies the desquamatory stage of the disease, which makes it different from the other acute infectious diseases. The effort must be not only to destroy the contagion conveyed in these particles, but to prevent the scattering of the said particles into the apartment where they become mingled with the dust always present in the atmosphere. Therefore, each case of scarlet fever must be a study in itself. No hard and fast rule can be laid down as to the period of time after the appearance of the disease when disinfection should be practiced. So long as the desquamation of the patient continues so long is he or she liable to reinfect a room or apartment which has already been disinfected, no matter how thorough that disinfection has been. Observation alone can determine this point, and until the desquamation has ceased or means have been taken to minimize its danger, it is useless to undertake the disinfection of the sick room.

Much may be accomplished in the matter of prevention of spread of the disease by the thorough bathing of the patient with antiseptic baths, followed by inunction with any of the animal or vegetable oils, or with a vaseline which has been rendered mildly antiseptic, with carbolic acid, boracic acid, etc.

Methods of disinfection.

As before remarked, all methods are applicable, and if faithfully and intelligently applied all are probably efficacious. Obviously there must be a difference in the methods, depending upon the nature of the articles or materials to be disinfected. For the mattress of the sick room a surface disinfection may be accomplished, either by formaldehyd gas, by sulphur dioxide, or, if the infection is supposed to be deep seated, which it possibly may be, steam or immersion in hot water may be required.

Steam should only be applied in apparatus specially designed to obtain efficient action, and if immersion in hot water is the method determined upon, care must be exercised that the article to be disinfected is totally submerged, that the water is at the actual boiling point, and that the boiling continue for twenty minutes or half an hour.

Particular attention should be taken to effectually sterilize the dust of the living room, and the walls, ceiling, and floor of the apartment. Carpets, if any, should be removed and treated either by steam, by immersion in hot water, or by thorough exposure to one of the gaseous disinfectants to be considered hereafter. The walls, ceiling, and floor had better be thoroughly wiped down with a solution of bichloride of mercury, 1–1000 in strength, or carbolic acid of a strength of 5 per cent. This cleaning must be thorough, as any dereliction will almost certainly meet its punishment in a renewal of the infection.

Disinfection with sulphur dioxide would be perfectly efficient against scarlet fever, but is open to the objection that, when applied in the proper germicidal strength for a sufficient length of time, it will injure or ruin any clothing, hangings, upholstery, and furniture which may be subjected to its action. Undoubtedly it will sometimes become necessary to use this agent, in which case, with the limitation as to usefulness mentioned above, 3½ to 4 pounds of powdered sulphur should be burned in the tightly closed room to every 1,000 feet of space, all cracks, windows, and doors being tightly sealed, and the room should be kept closed from twelve to twenty-four hours. Due care should be taken that the vessels in which the sulphur is burned should be immersed in other vessels containing water, which, by its vaporization, renders the sulphur dioxide germicidally active, and without which moisture the process is useless.

Probably formaldehyd is the best germicide for the disinfection of the sick room or for the bedding and fabrics therein contained, with the possible exception of mattresses. Four methods of using the formaldehyd gas may be mentioned, namely:

First. The sheet method.

Second. The Kuhn lamp.

Third. By evolving formaldehyd from its watery solution by apparatus without pressure; and

Fourth. By the autoclave.

First. The sheet method may be briefly described as spraying suspended sheets with 5 ounces of the 40 per cent solution of formaldehyd gas (formalin) for each 1,000 cubic feet of space; the time of exposure to be not less than five hours. The quantity should be divided between several sheets, and the liquid should be sprayed upon these sheets so as to form small drops rather than to effect a general wetting of the surface.

Second. The Kuhn lamp depends for effectiveness upon the production of formaldehyd by oxidation of wood alcohol by passing it over a platinized surface in a state of incandescence. The method requires the use of about 20 ounces of wood alcohol to about each 1,000 cubic feet of space, and the time of exposure should be not less than six hours, counting from the time when the alcohol is all volatilized. One objection that has been made is that it may require a large number of lamps or generators. This may be avoided by placing the generator immediately within the door of the apartment undergoing disinfection upon a board or other suitable contrivance. The apparatus may be withdrawn after the completion of the volatilization of the alcohol (about an hour and a half) by quickly opening the door and withdrawing it by means of a cord or rope previously attached to it. This can be quickly done without loss of gas, and the apparatus is then available for use in another apartment.

Third. The third method involves the employment of various forms of formaldehyd regenerating apparatus, of which the Trenner-Lee, the Lentz, and others too numerous to mention, may be accepted as types.

The process depends upon the principle of evolving without pressure formaldehyd gas from its watery solution, to which 1 per cent of glycerin has been added. The process is one, so to speak, of disinfection by distillation. The apparatus is in sight and the gas is injected into the room or apartment through the key hole by means of a flexible tube. Twenty ounces of the formaldehyd solution. with the addition of 1 per cent of glycerin should be used for each 1,000 cubic feet of space, and the apartment kept closed for six hours.

Fourth. Disinfection by the autoclaves manufactured by the Kuy-Schurer Company and the Kensington Engine Works, differs from the above process in that the formaldehyd gas is generated by heating formalin mixed with a neutral salt in a retort under a pressure of at least 45 pounds to the square inch. At least 10 ounces of fluid should be used for each 1,000 cubic feet of space, and the time of exposure may be varied from two to twenty-four hours; six hours in general practice would be amply sufficient, but care must be taken that to the formaldehyd solution is added 20 per cent of a neutral salt, such as borax or calcium chloride, and that the pressure in the apparatus is from 45 to 60 pounds per square inch. The gas is injected into the room through the keyhole by means of the nozzle and flexible rubber tube.

Any of the methods above given will prove thoroughly efficient in practice. Thoroughness of work is in this, as in all other disinfecting processes, an essential requirement, nothing must be neglected—nothing left to chance.

The infection of scarlet fever is very insidious, very long lived, and only fairly resistant. It must be thoroughly reached in order to be destroyed, but it is believed that the application of any one of the methods given above, or any combination of the methods, will result in thorough destruction of the infection if care is exercised in discriminating as to the time when the disinfecting process is employed. This should not be before the desquamation of the patient is complete, and even after the desquamatory process is apparently completed, care should be exercised as to frequent bathing of the patient, and the application of the oily or greasy substances made mention of above.

In this, as in all other processes connected with disinfection or protection against infectious and contagious diseases, almost as much will depend upon the judgment of the health officer or attending physician as upon the method.

Smallpox in Buffalo, N. Y.

BUFFALO, N. Y., *December 4, 1901.*

SIR: I have the honor to state for your information that the local health authorities report verbally that, since my last letter on the subject, there have occurred 39 cases of variola, making in all 64 cases and 2 deaths in connection with the recent outbreak in the eastern part of the city. The disease is of mild character, and the authorities are finding much difficulty in learning of cases, since parents are disposed to screen their children from the demands of isolation when ill, and continue to send others that have been exposed to the public schools. It has become impossible to care for all cases in the isolation hospital, since the present building is so limited in capacity and so much out of repair. Isolation is, therefore, practiced so far as may be in the homes of the patients, or in tents placed upon the premises. Disinfection is freely practiced and vaccination stations have been opened at convenient locations, which measures are expected to result in an early improvement of the situation.

Respectfully,

EUGENE WASDIN,
Surgeon, U. S. M. H. S.

Smallpox in Tacoma, Wash.

TACOMA, WASH., *November 26, 1901.*

SIR: I have the honor to report to you that since reporting to you on November 6, that this port was free from smallpox, there have been 4 new cases in this city, all of which have come from outside places, viz, Sister of charity, November 19, from Oregon; tramp, November 13, from Seattle, Wash.; tramp, November 21, from Montana; laborer, November 23, from Seattle, Wash. There are several cases outside of city limits which are taken care of by the county authorities. All of the above cases are of the usual mild type.

Respectfully,

T. J. SCHUG,
Acting Assistant Surgeon, U. S. M. H. S.